

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously amended) A processor comprising:

an out-of-order microinstruction pointer ( $\mu$ IP) stack for storing pointers in a microcode ( $\mu$ code) execution core.

2. (Currently amended) The processor of claim 1 in which entries in the  $\mu$ IP stack comprise ~~comprises~~:

an entry number field;  
a microinstruction pointer ( $\mu$ IP) field;  
a back pointer field;  
a retirement indicator field; and  
a return pointer field.

3. (Original) The processor of claim 2 in which the  $\mu$ IP field is 14-bits wide.

4. (Original) The processor of claim 3 in which the  $\mu$ IP field has a microinstruction pointer ( $\mu$ IP) pushed by a first microoperation ( $\mu$ Op) code and used by a second  $\mu$ Op code.

5. (Original) The processor of claim 2 in which the back pointer field has a pointer to a next entry in the  $\mu$ IP stack for a micro-type of service ( $\mu$ TOS) bit to point to after a  $\mu$ Op.

6. (Original) The processor of claim 2 in which the retirement indicator field has an indication of whether an entry has retired.
7. (Original) The processor of claim 2 in the return pointer field a pointer to a location in a retirement stack to which an entry is copied after being retired.
8. (Previously amended) A method executed in a processor comprising:
  - executing microcode ( $\mu$ code) addressed by pointers stored in an out-of-order microinstruction pointer ( $\mu$ IP) stack; and
  - manipulating the  $\mu$ IP stack with a set of microinstructions.
9. (Currently amended) The method of claim 8 in which entries in the stack have ~~has~~ an entry number field, a microinstruction pointer ( $\mu$ IP) field, a back pointer field, a retirement indicator field and a return pointer field.
10. (Original) The method of claim 9 in which the  $\mu$ IP pointer field is 14-bits wide.
11. (Original) The method of claim 10 in which the  $\mu$ IP pointer field has a microinstruction pointer ( $\mu$ IP) pushed by a first microoperation ( $\mu$ Op) code and used by a second  $\mu$ Op code.
12. (Original) The method of claim 9 in which the back pointer field has a pointer to a next entry in the  $\mu$ IP stack for a micro-type of service ( $\mu$ TOS) bit to point to after a  $\mu$ Op.
13. (Original) The method of claim 9 in which the retirement indicator field has an indication of whether an entry has retired.
14. (Original) The method of claim 9 in which the return pointer field contains a pointer to a location in a retirement stack to which an entry is copied after being retired.

15. (Original) The method of claim 9 in which manipulating comprises:  
pushing a next μIP on to the μIP stack; and  
using the next μIP in an intermediate field as a target μIP in a jump operation.
16. (Original) The method of claim 9 in which manipulating comprises:  
taking a value of an intermediate field of a microoperation (μOp); and  
pushing the value on to the μIP stack.
17. (Original) The method of claim 9 in which manipulating comprises:  
popping a value off the μIP stack; and  
replacing a current μOp intermediate field.
18. (Original) The method of claim 9 in which manipulating comprises:  
popping a value off of the μIP stack; and  
jumping to that value.
19. (Original) The method of claim 9 in which manipulating comprises:  
reading a value off the μIP stack; and  
replacing a μOp's intermediate field with the value.
20. (Original) The method of claim 9 in which manipulating comprises setting the μIP stack pointers to reset.
21. (Original) The method of claim 9 further comprising providing a set of pointers that point to different entries in the μIP stack.

22. (Original) The method of claim 21 in which the set of pointers includes a  $\mu$ TOS pointer that points to a top of the  $\mu$ IP stack.

23. (Original) The method of claim 21 in which the set of pointers includes a  $\mu$ Alloc pointer that points to a next allocated entry in the  $\mu$ IP stack.

24. (Original) The method of claim 21 in which the set of pointers includes a NextRet pointer that points to a next entry in the  $\mu$ IP stack to be deallocated.

25. (Original) The method of claim 21 in which the set of pointers includes  $\mu$ RetTos pointer that points at a retired top of the  $\mu$ IP stack.

26. (Original) The method of claim 8 in which the  $\mu$ OPs include an ms\_call  $\mu$ OP that takes a next  $\mu$ IP, pushes the next  $\mu$ IP on the  $\mu$ IP stack, and uses the next  $\mu$ IP in an intermediate field as a target  $\mu$ IP of a jump.

27. (Original) The method of claim 8 in which the  $\mu$ OPs include an ms\_push  $\mu$ OP that takes a value in an intermediate field and pushes the value on the  $\mu$ IP stack.

28. (Original) The method of claim 8 in which the  $\mu$ OPs include an ms\_pop  $\mu$ OP that pops a value off the  $\mu$ IP stack and replaces the value with the  $\mu$ OP's intermediate field.

29. (Original) The method of claim 8 in which the  $\mu$ OPs include an ms\_return  $\mu$ OP that pops a value off of the  $\mu$ IP stack and jumps to that  $\mu$ IP.

30. (Original) The method of claim 8 in which the  $\mu$ OPs include an ms\_tos\_read  $\mu$ OP that reads a value off the  $\mu$ IP stack and replaces this  $\mu$ OP's intermediate field.

31. (Original) The method of claim 8 in which the μOPs include an ms\_μip\_stack\_clear μOP that sets the μIP stack pointers to reset.

32. (Previously amended) A computer program product residing on a computer readable medium having instructions stored thereon which, when executed by the processor, cause the processor to:

execute microcode (μcode) addressed through pointers stored in an out-of-order microinstruction pointer (μIP) stack; and  
manipulate the μIP stack with a set of microinstructions.

33. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

push a next μIP on to the μIP stack; and  
use the next μIP in an intermediate field as a target μIP in a jump operation.

34. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

take a value of an intermediate field of a microoperation (μOp); and  
push the value on to the μIP stack.

35. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

pop a value off the μIP stack; and  
replace a current μOp intermediate field with the value.

36. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

pop a value off of the μIP stack; and

jump to that value.

37. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

read a value off the μIP stack; and  
replace a μOp's intermediate field with the value.

38. (Original) The computer program product of claim 32 wherein instructions to manipulate further comprise instructions to:

set the μIP stack pointers to reset.